



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

author. Especially interesting are the life-restorations, some of which are here published for the first time. There is no one better fitted to discuss the subject-matter contained in this book than the author of this volume. In it he gives to the public the benefit of his observations gathered from over forty years of actual experience in the reptilian field. It is rare indeed that a subject is given such an authoritative, scientifically exact treatment combined with a style so thoroughly understandable and interesting to the non-scientific reader. The work is sure to be very popular with the scientist and the general public alike.

M. G. MEHL

The Climatic Factor as Illustrated in Arid America. By ELLSWORTH HUNTINGTON, Assistant Professor of Geography in Yale University, with contributions by CHARLES SCHUCHERT, ANDREW E. DOUGLASS, and CHARLES J. KULLMER. Carnegie Institution of Washington, Publication No. 192, 1914. Pp. vi + 341, plates 12, maps 2, text figs. 90.

This volume has bearings which make it important to the geographer, historian, archeologist, meteorologist, and geologist, occupying a field where all these sciences meet, but in this review the volume will be discussed from the geological point of view only.

The purpose of the work is to determine the degree to which climatic changes have taken place in southwestern America during the past 2,000 to 3,000 years. In arid and semi-arid regions the amount of rainfall, as affected by pulsatory changes of climate, becomes most variable and critical.

In addition to the study of the climatic changes shown by the expansion and restriction of ancient peoples in America, as controlled by changes in water-supply or vegetation, the present volume contains two novel lines of attack. The first of these is the use of river terraces as evidences of minor climatic changes occurring within the past few centuries as well as in the more distant past. The second is the measurement of the growth rings of trees. Professor A. E. Douglass gives an introductory chapter on a method of estimating rainfall by the growth of trees. He shows that the rings vary in thickness and correlates the rate of growth with the records of rainfall. Following this, Huntington enters upon a most interesting discussion of the curve of growth of the giant redwoods of California. The data were obtained by careful measurements from stumps and extend back with a large number of trees as much as 2,000 years, with a few trees to 3,000 years. The geological importance of this work is readily seen. As Lyell showed that the present is the key to the past in the crustal history of the earth, similarly the key to the climatic history is to be found in the study of the present climates and

their fluctuations. It is found that the changes, though moderate in amount, are more or less sudden and pulsatory. In the search for causes Huntington consequently assigns crustal movements and changes in atmospheric composition as the broad factors of ultimate control, but the pulsations which appear within the historic record and which extend beyond in the record of moraines left by the oscillations of glaciers, the strands of salt lakes, and terraces made by river action cannot, he argues, be due to these causes. Variations in solar radiation are assigned as the most probable cause. Rhythms measured by tens of miles marked the retreat of the Pleistocene ice sheets; rhythms measured by inches, by feet, and by tens of feet are found in the sediments of many geological formations. In many cases they can hardly be ascribed to crustal causes; they are too many and both too long and too short to fit the precession cycle. Thus the geological record is suggestive that our sun through all of terrestrial history has been a variable star.

The second part of the volume consists of a chapter entitled "The Climates of Geologic Time, and is by Professor Schuchert. There is assembled in thirty pages an account of the various lines of evidence which indicate geologic changes in climate. These are finally correlated in a single chart. The curves of coal-making, limestone-making, aridity, and temperature are given, together with curves showing the movements of the strand line and epochs of diastrophism. While the curves are of course only of qualitative value, they serve to show the variability and the cyclic nature of all these factors through geologic time. This chapter thus gives on a large scale and in distant perspective what the first part of the book gives in minute scale and for the human present.

It would appear that the work of Douglass and Huntington on tree growth opens up a field which deserves further study; a study which should be prosecuted within a few years. In this reconnaissance Huntington has averaged together the measurements of many individual trees. But these have grown under unlike conditions of altitude, slope exposure, and ground water. The averaging of these unlike conditions has tended toward obscuring the amount of short climatic oscillations and the trend of longer changes. An intensive study of stumps selected with respect to these variable controls and an exact dating of special sequences of rings by comparison of stumps would seem to be the next step. But in the meantime decay is blurring year by year this most valuable record.

There are of course in this volume degrees of emphasis and points of view which could be questioned, but within the limits of a short review it would confer a wrong emphasis to single out any point for critical comment, when the book as a whole is a contribution of the first order, in facts, in ideas, and in completeness of presentation. It adds fundamentally to the science which in the future will be named if not now—paleoclimatology.

J. B.